Space Weather Forecast

Issued on Saturday, 03 February 2024 at 00:35 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Radio Blackouts. Peak chance of Minor Geomagnetic Storm Sunday 04 February.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been moderate, with a sunspot region on the southeast of the Sun producing an impulsive Moderate-class X-ray flare at 02/0301UTC.

There are now seven numbered sunspot regions on the facing side, including the above. Although the region responsible for the peak flare and much of the Common-class activity is one of the less threatening regions on paper, these flares appeared to link more extensively across the southeastern quarter of the Sun and were associated with at least two and perhaps more Coronal Mass Ejections (CMEs). Confidence in the detail for CMEs from this part of the Sun is now low, with some extreme-UV imagery evidence perhaps suggesting CMEs emerging from higher in the corona may be possible.

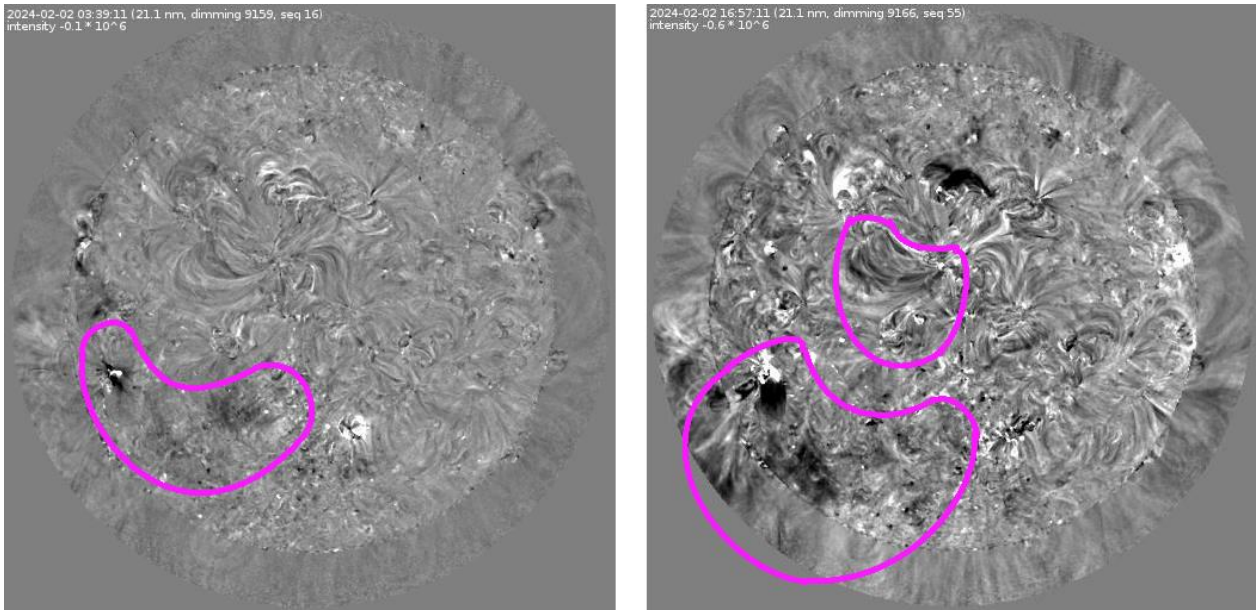

Figure 1: SIDC ROB time-integrated extreme UV 'coronal dimmings' from an active region in the southeast – these often denote CMEs. This is far from an exhaustive list of events from this region in the period, however at the time of writing none has been confirmed as Earth-directed, with analyses continuing.

Overall, at the time of writing, no new CMEs appear to carry any Earth-directed component, however further analyses are being carried out to confirm this. Activity in this group makes it one to monitor, especially as further rotation carries it and any ejecta it may produce nearer the Sun-

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Earth line.

Solar Wind / Geomagnetic Activity: Solar winds were reflective of a slow solar wind regime. The solar wind speed declined slightly within background levels. The number of particles in the solar wind showed a roughly level tendency within typical background values, while the associated magnetic field was low amplitude and steady throughout. The net result of the above solar wind measures was provisionally quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: Solar radiation levels remain slightly elevated above background levels following the Moderate class X-ray flare on 29 Jan from a sunspot now several days onto the far side. This enhancement remains well below the S1/Minor Radiation Storm threshold, with a peak of 1.1pfu observed at 02/1130UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Overall activity is most likely to be low, but with an increasing chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: A CME which left the Sun at 01/0743UTC may deliver a glancing blow either late Saturday 03 February or more likely early Sunday 04 February. In addition there may be also be a fast wind enhancement during this period, although likely more biased to effects on 04 into 05 February.

This period now carries low confidence regarding inbound CMEs due to the prolific activity in the southeastern sunspot region. Although at present no Earth-directed components have been positively identified, analyses are ongoing. Geomagnetic activity is otherwise expected to start and end the four-day period quiet, with perhaps a peak chance of Minor Geomagnetic Storm G1 should the fast wind combine with glancing CME effects on Sunday 04 February, with a slight chance of similar activity flanking this UTC day.

Energetic Particles / Solar Radiation: High energy proton flux is expected to remain below the S1/Minor Radiation Storm level, with a daily Slight Chance of exceeding the S1 threshold during the period.

The high energy electron flux (greater than 2MeV) is expected to remain below High levels throughout the period, with exceedance of the Active fluence threshold considered unlikely.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	25	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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